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Animal and Vegetable Dusts as a Cause of Deep Lung Inflammation

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ANIMAL AND VEGETABLE DUSTS AS A CAUSE OF DEEP LUNG INFLAMMATION

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ANIMAL AND VEGETABLE DUSTS AS A CAUSE OF DEEP LUNG INFLAMMATION

This publication was prepared as a source of information for health and safety committees and others with an interest in understanding and reducing the occupational risk of deep lung inflammation caused by animal and vegetable dusts.

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INTRODUCTION

Intense or prolonged exposure to dusts of animal and vegetable origin can result in several lung diseases.

Mouldy hay, straw, grain and feathers or bird droppings are examples of origins of these dusts.

Some of the lung diseases resulting from such dust exposures are grouped under the name "extrinsic allergic alveolitis." The name, although complicated, describes the origin and the nature of these diseases.

- "extrinsic"--originating outside the body
- "allergic"--caused by the reaction of the body to a specific substance or condition
- "alveolitis"--an inflammation in the inner part of the lungs (alveoli)

It is not easy to identify all of the occupations in which workers might develop extrinsic allergic alveolitis. The number of workers at risk is large, especially in the agricultural sector. But any significant exposure to dust of animal and vegetable origin poses a risk of the disease.

1. THE DUSTS

Animal and vegetable dusts are a complex mixture of vegetable particles such as husks, bark, wood, and microorganisms including bacteria and fungi. The microorganisms produce toxic chemicals which form part of the mixture. Insects and insect fragments, bird droppings and the urine of rats also add to the mixture.

2. THE DEVELOPMENT OF EXTRINSIC ALLERGIC ALVEOLITIS

Extrinsic allergic alveolitis does not develop on the first day of exposure to animal and vegetable dusts. Repeated and prolonged exposure is necessary. Even then, only some workers develop allergic reactions to the dusts.

The allergy is triggered by complicated reactions of the body's natural defense system that normally protects the lungs from alien substances. In some individuals, the chemical reactions of the defense system that should protect the lungs cause inflammation and lung damage. The body's changing response to the presence of dust in the lungs is called sensitization.

The effects of the allergic reaction, once the victim is sensitized, usually start about four to eight hours after dust has been inhaled into the lungs.

Shortness of breath is the main symptom. The attack usually ends after about 48 hours, provided that there is no further exposure to dust.

3. SYMPTOMS OF EXTRINSIC ALLERGIC ALVEOLITIS

Extrinsic allergic alveolitis, once the victim is sensitized, is marked by three different types of responses: acute (intense) response, sub-acute (recurrent) response, and chronic (long-term) response.

The acute attack is triggered by heavy exposure to dust. It starts with fever, muscular aches and a general feeling of unwellness. These symptoms are accompanied by tightness in the chest, a dry cough, and shortness of breath.

The sub-acute response occurs most frequently to people exposed to relatively low levels of dust. It is marked by cough, shortness of breath, sweating, sore throat, headache, and nausea.

The chronic response develops after persistent acute attacks and recurrent sub-acute responses. It is marked by increasing shortness of breath, occasional fever, loss of weight, and general lack of energy. The victim suffers permanent lung damage and, in the worst cases, death may occur.

4. DIAGNOSIS AND TREATMENT

In diagnosis, the best evidence for extrinsic allergic alveolitis is the victim's occupation and a history of exposure to animal or vegetable dusts. Even though the doctor may want to perform some tests, such as lung x-rays, blood tests or lung function tests, these are not specific and may not distinguish between extrinsic allergic alveolitis and other lung problems.

Following diagnosis, the victim must avoid future exposure to animal and vegetable dusts. This action alone results in improvement. For serious cases, medications that make breathing easier are needed.

5. OCCUPATIONS AT RISK

The working population in which extrinsic allergic alveolitis has been seen is diverse. Undoubtedly, any list of causal agents is incomplete since new ones continue to be described, and many remain to be discovered.

The following table lists several examples of extrinsic allergic alveolitis and the related occupations.

6. DUST CONTROL

The means for reduction of dust exposure include engineering control and personal protective equipment. Education is also important, and educational programs should emphasize the significance of animal and vegetable dust in causing diseases. Managers and workers should learn about methods of storing materials to prevent mould formation and to reduce dust.

Methods of engineering control include local exhaust ventilation, general ventilation, process enclosure and process isolation (separating the worker from the dusty process).

On farms, prevention of particle release and control of dust cloud formation are achieved by well-designed, leakproof ducting and conveyor systems for grains and feeds. Buildings should have local ventilation systems in

Table - Examples of extrinsic allergic alveolitis

Disease	Exposure	Preventive Measures
Air conditioner lung	Humidifier water	Maintenance of air and water handling systems.
Animal handlers' lung	Dust of dander, hair particles, dried urine of rats	Good exhaust ventilation.
Bagassosis	Mouldy sugar cane	Application of 1% propionic acid to bagasse. Good exhaust ventilation. Enclosure of processes.
Bird fanciers' lung	Droppings and feathers	Good exhaust ventilation. Water spraying of droppings while cleaning.
Cheesewashers' lung	Cheese mould	Wrapping the cheese in foil during aging.
Farmers' lung	Mouldy hay, straw, grain	See "Dust Control" in text.
Maltworkers' lung	Mouldy malt	Application of mechanical methods in the malting process.
Maple bark strippers' disease	Mouldy maple bark	Spraying of logs during debarking. Remote control of some operations.
Mushroom workers' lung	Mouldy mushroom compost	Good exhaust ventilation.
Sequoiosis	Mouldy sawdust	Good exhaust ventilation. Enclosure of processes.
Sewage sludge disease	Dust of heat-treated sludge	Good exhaust ventilation. At outside facilities, stand upwind of storage piles.
Wheat weevil lung	Mouldy grain, flour, dust	See "Dust Control" in text.
Suberosis	Mouldy cork dust	Good exhaust ventilation.
Wood pulp workers' disease	Mouldy wood chips	Good exhaust ventilation. Remote control of some operations.

areas frequented by workers engaged in egg-handling and feed storage and preparation. Within enclosed livestock units, temperature and relative humidity should be monitored. Windows and doors in barns should be kept open. When opening mouldy bales, workers should use a fork to keep their distance, and they should try to stand upwind in the open air or create a through draft if in a building. Feed pelleting, moist grain, or silage should be used instead of hay for feed preparation. For field operations, tractors or combine harvesters with enclosed cabs provided with filtered air should be used.

Personal protective equipment may be vital, but it should nevertheless be the last resort of protection. Personal protective equipment should not be a substitute for proper dust control and should be used only where dust control methods are not yet effective or are inadequate.

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